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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,106	11/14/2003	Jiutao Li	M4065.0706/P706	8216

45374 7590 06/03/2009

DICKSTEIN SHAPIRO LLP
1825 EYE STREET, NW
WASHINGTON, DC 20006

EXAMINER	
MCDONALD, RODNEY GLENN	
ART UNIT	**PAPER NUMBER**
1795	
MAIL DATE	**DELIVERY MODE**
06/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/712,106	Applicant(s) LI ET AL.	
	Examiner Rodney G. McDonald	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 02 March 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-86 is/are pending in the application.

4a) Of the above claim(s) 85 and 86 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-84 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 1, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be

layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 1), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claim 3, Ovshinsky et al. teach utilizing a sputter power of 40-60 watts for depositing the semiconductor material. (See Table 2)

Regarding claim 6, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The differences between Ovshinsky et al. and the present claims is that sputtering a semiconductor target at temperature less than about 350 degrees C is not discussed (Claim 1), maintaining the target temperature less than 250 degrees C is not discussed (Claim 2), the power density is not discussed (Claim 4), maintaining the silver selenide target temperature of less than about 350 degrees C by maintaining a sputter gas pressure of less than about 40 mTorr is not discussed (Claim 5), maintaining the silver selenide target temperature of less than about 350 degrees C by maintaining a

sputter gas pressure of less than about 10 mTorr is not discussed (Claim 6), maintaining a silver selenide target temperature less than about 350 degrees C by using a sputter gas having a molecular weight at least greater than the molecular weight of neon is not discussed (Claim 7), maintaining the silver selenide target temperature of less than about 350 degrees C by cooling the silver selenide sputter target with a cooling apparatus is not discussed (Claim 9) and the sputtering performed by an RF field is not discussed (Claim 12).

Regarding claim 1, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63)

Regarding claim 2, Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56)

Regarding claim 4, Case et al. teach the power density can be “less than about” 1 W/cm^2. (Column 7 lines 56-58; i.e. 1.1 W/cm^2 is interpreted to read on “ less than about” 1 W/cm^2.)

Regarding claim 5, Case et al. teach the target can be kept at a temperature less than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 6, Case et al. teach the target can be kept at a temperature less than 350 degrees C. (Column 7 lines 54-56)

Regarding claim 7, Case et al. teach maintaining the target at less than 350 degrees C and utilizing a sputter gas having a molecular weight greater than neon. (Column 7 lines 54-56; Column 7 lines 25-32; Column 8 lines 32)

Regarding claim 9, Case et al. teach maintaining the target below 350 degrees C by utilizing a cooling apparatus. (Column 6 lines 28-30)

Regarding claim 12, Case et al. teach that the sputtering can be performed in AN RF field. (Column 10 lines 42)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 1-7, 9 and 12 above, and further in view of Boys et al. (U.S. Pat. 4,500,408).

The difference not yet discussed is the position of the magnetron to control temperature. (Claim 8).

Regarding claim 8, Boys et al. teach positioning a magnetron to control the temperature. (Column 5 lines 34-45)

The motivation for positioning a controllable magnetron is that it allows control of temperature of the target. (Column 5 lines 34-45)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Boys et al. because it allows for control of temperature of the target.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 1-7, 9 and 12 above, and further in view of Sellers (U.S. Pat.5,810,982).

The difference not yet discussed is using DC or pulsed DC for the sputtering process. (Claims 10 and 11)

Regarding claims 10 and 11, Sellers teach applying pulses of a positive voltage onto negative dc sputtering current that is applied to the target of a dc sputtering process to create a reverse bias. This charges insulating deposits on the target to the reverse bias level, so that when negative sputtering voltage is reapplied to the target, the deposits will be preferentially sputtered away. The reverse bias pulses are provided at a low duty cycle, i.e., with a pulse width of 0.25 to 3 microseconds at a pulse range of 40 to 200 KHz. (See Abstract) Sellers further teach that the pulse DC sputter deposition process eliminates dielectric materials and other impurities on the target. (Column 4 lines 55-58)

The motivation for utilizing a pulse DC sputter deposition process, a particular frequency of the pulse DC sputter deposition process and the pulse width range of the pulse DC sputter deposition process is that it will allows for reduction or elimination of sources for arcing. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized DC and pulsed DC sputtering as taught by Sellers because it eliminates arcing.

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 13, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the layer containing both alpha and beta silver selenide (Claim 13), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300

degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claims 15, 16, Ovshinsky et al. teach utilizing a sputter power of 40-60 watts for depositing the semiconductor material. (See Table 2)

The differences between Ovshinsky et al. and the present claims is that sputtering a semiconductor target at a temperature of less than about 350 degrees during the sputtering process is not discussed (Claim 13) and maintaining the target at less than 250 degrees C during the sputtering process is not discussed (Claim 14).

Regarding claim 13, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63)

Regarding claim 14, Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 17-19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 17, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the semiconductor film containing both alpha and beta silver selenide (Claim 17), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for

depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The differences between Ovshinsky et al. and the present claims is that the power density is not discussed (Claim 17), maintaining the target temperature of less than about 350 degrees during the sputtering process is not discussed (Claim 18), maintaining the target at less than 250 degrees C is not discussed (Claim 19), how the power density is measured (Claims 20, 24) and the sputter profile being uniform is not discussed (Claim 23).

Regarding claims 17, 18, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach the power density can be “less than about” 1 W/cm^2. (Column 7 lines 56-58; i.e. 1.1 W/cm^2 is interpreted to read on “ less than about” 1 W/cm^2.) Case et al. teach that the target is temperature is maintained at less than 350 degrees C during the sputtering process. (Column 7 lines 54-56)

Regarding claim 19, Case et al. teach the target can be kept at a temperature less than 250 degrees C. (Column 7 lines 54-56)

Regarding claims 20 and 24, since Case et al. teach the power density to be power divided by area which suggest applicant's measurement.

Regarding claim 23, since Case et al. teach the same conditions as Applicant the target profile is uniform.

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view Case et al. as applied to claims 17-19, 20, 23 and 24 above, and further in view of Boys et al. (U.S. Pat. 4,500,408).

The differences not yet discussed is the non-uniform erosion (Claim 21) and the race track profile (Claim 22)

Regarding claims 21, 22, Boys et al. teach utilizing a magnetron to produce a racetrack profile. (See Figs. 1, 2)

The motivation for utilizing the features of Boys et al. is that it allows for depositing films. (Column 1 lines 9-12)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Boys et al. because it allows for depositing films.

Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 4,818,357) in view of Case et al. (U.S. Pat. 5,534,711).

Regarding Claim 25, Ovshinsky et al. teach Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 25), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for

depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The differences between Ovshinsky et al. and the present claims is that maintaining the target at a temperature less than 350 degrees C and less than 40 mTorr is not discussed (Claims 25, 26) and maintaining the temperature less than 250 degrees C is not discussed (Claim 27).

Regarding Claims 25, 26, 27, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach the target can be kept at a temperature less than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56) Case et al. teach the target can be kept at a temperature less than 250 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

The motivation for utilizing the features Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features

of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 28, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 28), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claim 28, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The differences between Ovshinsky et al. and the present claims is that maintaining the target temperature less than 350 degrees C and less than 40 mTorr is not discussed (Claims 28,29) and maintaining the target at a temperature less than 250 degrees C is not discussed (Claim 30).

Regarding claims 28, 29, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach the target can be kept at a temperature less than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 30, Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features

of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 31, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 31), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The differences between Ovshinsky et al. and the present claims is that maintaining the target at less than 350 degrees C and utilizing a sputter gas having a molecular weight greater than neon is not discussed (Claim 31), utilizing argon is not discussed (Claim 32) and utilizing xenon is not discussed (Claim 33).

Regarding claim 31, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach maintaining the target at less than 350 degrees C and utilizing a sputter gas having a molecular weight greater than neon. (Column 7 lines 54-56; Column 7 lines 25-32; Column 8 lines 32)

Regarding claim 32, Case et al. teach utilizing argon as the sputtering gas. (Column 8 line 32)

Regarding claim 33, Case et al. teach that the gas can be an inert gas which include xenon. (Column 7 lines 25-32)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for making a semiconductor memory element.

Claims 34-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 34, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 34), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The difference between Ovshinsky et al. and the present claims is that maintaining the target below 350 degrees C by utilizing a cooling apparatus is not discussed (Claim 34), maintaining the target below less than 250 degrees C is not discussed (Claim 35), a target backing plate attached to and in thermodynamic contact with the semiconductor target is not discussed (Claim 36), a cooling jacket is not discussed (Claim 37), a cooling fluid flowing across the target backing plate is not discussed (Claim 38), the cooling flow set by the operator at a desired temperature is not discussed (Claim 39), the cooling temperature below 25 degrees C is not discussed (Claim 40), and maximizing thermal conductivity is not discussed (Claim 41).

Regarding claim 34, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach maintaining the target below 350 degrees C by utilizing a cooling apparatus. (Column 6 lines 28-30)

Regarding claim 35, Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56)

Regarding claim 36, Case et al. teach a target backing plate attached to and in thermodynamic contact with the semiconductor target. (Column 10 lines 64-68; Fig. 2)

Regarding claim 37, Case et al. teach the sputtering target has a cooling jacket in the form of water jacket. (Column 10 lines 64-68)

Regarding claim 38, Case et al. teach that the cooling chamber allows a cooling fluid to flow across the target backing plate. (Column 10 lines 64-68; Fig. 2)

Regarding claim 39, the cooling flow is set by the operator and desired temperature. (Column 10 lines 64-68)

Regarding claim 40, since the target can be cooled to a temperature less than 50 degrees C the cooling fluid must be also at a temperature less than 50 degrees C. Such range encompasses applicant's claims. (Column 7 lines 54-56; Column 10 lines 64-68; Fig. 2)

Regarding claim 41, Case et al. show in Fig. 2 that the thermal conductivity is maximized. (See Fig. 2)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 34-41 above, and further in view of Hollars et al. (U.S. Pat. 5,753,092).

The difference not yet discussed is the color black. (Claim 42)

Regarding claim 42, Hollars et al. teach utilizing black paint on elements to facilitate heat removal. (Column 10 lines 45-56)

The motivation for utilizing the color black is that it facilitates heat removal. (Column 10 lines 45-56)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the feature of Hollars et al. because it allows for assisting in heat removal.

Claims 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711). in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 43, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 43), Ovshinsky et al. teach typical conditions for depositing memory material

including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The differences between Ovshinsky et al. and the present claims is that maintaining the target temperature of less than about 350 degrees during the sputtering at appropriate target to substrate spacing is not discussed (Claim 43) and maintaining the target at a temperature of less than 250 degrees during the sputtering process is not discussed (Claim 44).

Regarding claim 43, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) In Fig. 2 Case et al. show the appropriate spacing between the target and the substrate. (See Fig. 2)

Regarding claim 44, Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 45-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 45, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 45), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature

to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claim 45, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The difference between Ovshinsky et al. and the present claims is that the target being kept at a temperature of less than 350 degrees C and less than 40 mTorr during sputtering is not discussed (Claim 45), the sputtering gas being argon is not discussed (Claim 46), the sputtering gas being xenon is not discussed (Claim 47), the target being kept at a temperature of less than 350 degrees is not discussed (Claim 48) and the target cooled by a cooling apparatus is not discussed (Claim 49).

Regarding claim 45, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas (Argon) into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach the target can be kept at a temperature less than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 46, Case et al. teach the sputter gas can be argon. (Column 7 lines 54-56; Column 7 lines 25-32; Column 8 lines 32)

Regarding claim 47, Case et al. suggest the gas can be an inert gas which encompasses xenon. (Column 7 lines 25-32)

Regarding claim 48, Case et al. teach the target can be kept at a temperature less than 350 degrees C. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 49, Case et al. teach maintaining the target below 350 degrees C by utilizing a cooling apparatus. (Column 6 lines 28-30)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Case et al. by utilizing the features of Ovshinsky et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claims 50-57 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claims 50, 51, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element

(i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 50), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claim 56, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The difference between Ovshinsky et al. and the present claims is that producing a defect film is not discussed (Claims 50, 51), the temperature being maintained at a temperature of less than about 350 degrees during the sputtering process (Claims 52), the power density is not discussed (Claims 53, 54), the pressure is not discussed (Claim 55), the gas used for sputtering is not discussed (Claim 57), and utilizing a cooling apparatus is not discussed (Claim 59).

Regarding claims 50, 51, since Case et al. in combination with Ovshinsky et al. teach producing films at applicant's conditions then the film produced is considered to be defect free. (See Case et al. and Ovshinsky et al. discussed above)

Regarding claim 50, 51, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63)

Regarding claim 52, Case et al. teach that the target is temperature is maintained at less than 350 degrees C during the sputtering process. (Column 7 lines 54-56)

Regarding claims 53, 54, Case et al. teach that the target temperature is maintained at less than 350 degrees C during the sputtering while the power density can be "less than about" 1 W/cm^2. (Column 7 lines 56-58; i.e. 1.1 W/cm^2 is interpreted to read on " less than about" 1 W/cm^2.)

Regarding claim 55, Case et al. teach the target can be kept at a temperature less than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 57, Case et al. teach maintaining the target at less than 350 degrees C and utilizing a sputter gas having a molecular weight greater than neon. (Column 7 lines 54-56; Column 7 lines 25-32; Column 8 lines 32)

Regarding claim 59, Case et al. teach maintaining the target below 350 degrees C by utilizing a cooling apparatus. (Column 6 lines 28-30)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 50-57 and 59 above, and further in view of Boys et al. (U.S. Pat. 4,500,508).

The difference not yet discussed is positioning the magnetron to control temperature. (Claim 58)

Regarding claim 58, Boys et al. teach positioning a magnetron to control the temperature. (Column 5 lines 34-45)

The motivation for positioning a controllable magnetron is that it allows control of temperature of the target. (Column 5 lines 34-45)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Boys et al. because it allows for control of temperature of the target.

Claims 60-67 and 72-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Ovshinsky et al. (U.S. Pat. 5,534,711) in view of Case et al. (U.S. Pat. 4,818,357).

Regarding Claim 60, Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding the film containing both alpha silver selenide and beta silver selenide (Claim 60), Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

Regarding claim 76, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The differences between Ovshinsky et al. and the present claims is that the temperature being maintained at a temperature of less than about 350 degrees during the sputtering process (Claim 60), utilizing a cooling apparatus is not discussed (Claim 61), a target backing plate is not discussed (Claim 62), a water jacket is not discussed (Claim 63), cooling fluid flowing across the back of the target is not discussed (Claim 64), the cooling flow set by the operator is not discussed (Claim 65), the target being cooled to less than 25 degrees C is not discussed (Claim 66), the thermal conductivity is not discussed (Claim 67), the pressure is not discussed (Claim 72) and the gas used for sputtering is not discussed (Claim 73-75).

Regarding claim 60, Case et al. teach forming a semiconductor material on a substrate including providing an apparatus having a chamber and vacuum enclosure include a target made of semiconductor material. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63)

Regarding claim 61, Case et al. teach maintaining the target below 350 degrees C by utilizing a cooling apparatus. (Column 6 lines 28-30)

Regarding claim 62, Case et al. teach a target backing plate attached to and in thermodynamic contact with the semiconductor target. (Column 10 lines 64-68; Fig. 2)

Regarding claim 63, Case et al. teach the sputtering target has a cooling chamber in the form of water jacket. (Column 10 lines 64-68)

Regarding claim 64, Case et al. teach that the cooling chamber allows a cooling fluid to flow across the target backing plate. (Column 10 lines 64-68; Fig. 2)

Regarding claim 65, the cooling flow is set by the operator and desired temperature. (Column 10 lines 64-68)

Regarding claim 66, since the target can be cooled to a temperature less than 50 degrees C the cooling fluid must be also at a temperature less than 50 degrees C. Such range encompasses applicant's claims. (Column 7 lines 54-56; Column 10 lines 64-68; Fig. 2)

Regarding claim 67, Case et al. show in Fig. 2 that the thermal conductivity is maximized. (See Fig. 2)

Regarding claim 72, Case et al. teach the target can be kept at a temperature less than 350 degrees C and pressure less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claim 73, Case et al. teach maintaining the target at less than 350 degrees C and utilizing a sputter gas having a molecular weight greater than neon. (Column 7 lines 54-56; Column 7 lines 25-32; Column 8 lines 32)

Regarding claim 74, Case et al. teach the sputter deposition gas can be argon.

(Column 8 lines 32).

Regarding claim 75, Case et al. teach the sputter deposition gas to be an inert gas. Inert gas encompasses xenon. (Column 7 lines 25-32)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 60-67 and 72-76 above, and further in view of Hollars et al. (U.S. Pat. 5,753,092).

Regarding claim 68, Hollars et al. teach utilizing black paint on elements to facilitate heat removal. (Column 10 lines 45-56)

The motivation for utilizing the color black is that it facilitates heat removal. (Column 10 lines 45-56)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the feature of Hollars et al. because it allows for assisting in heat removal.

Claims 69-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. in view of Case et al. as applied to claims 60-67 and 72-76 above, and further in view of Boys et al. (U.S. Pat. 4,500,408).

The differences not yet discussed is the use of a magnetron (Claim 69) and the magnetron controlling the temperature (Claims 70, 71).

Regarding claims 69, 70, 71, Boys et al. teach positioning a magnetron to control the temperature. (Column 5 lines 34-45)

The motivation for positioning a controllable magnetron is that it allows control of temperature of the target. (Column 5 lines 34-45)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Boys et al. because it allows for control of temperature of the target.

Claims 77-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (U.S. Pat. 5,534,711). in view of Case et al. (U.S. Pat. 4,818,357).

Regarding the semiconductor material being silver selenide (Claims 77, 81), Ovshinsky et al. teach Ovshinsky et al. teach a method of forming a memory device from semiconductor material. The memory device have a large dynamic range of electrical resistance values. (See Abstract; Column 1 lines 19-33) The memory material of the device is formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (Column 14 lines 64-68; Column 15 lines 1-12) The memory material can be layered by forming a plurality of discrete, relatively thin layers of different composition. Any number of layers can be used and multiple layers of the same alloy may be present in the volume of memory material. (Column 19 lines 20-38) The layer of memory material can be deposited by sputtering. (Column 20 lines 56-60)

Regarding forming alpha phase and beta phase silver selenide (Claims 77, 81), since the combination of Case et al. with Ovshinsky et al. suggest Applicant process

conditions and silver selenide then deposition of alpha and beta phases will be taking place. (See Case et al. and Ovshinsky et al. discussed above)

Regarding claims 80, 84, Ovshinsky et al. teach utilizing a sputter power of 40-60 watts for depositing the semiconductor material. (See Table 2)

Regarding claims 80, 84, Ovshinsky et al. teach utilizing a pressure 4-8 mT for sputtering semiconductor material. (See Table 2)

The differences between Ovshinsky et al. and the present claims is that the pressure, power and temperature is not discussed (Claims 77, 81) and maintaining the temperature of the substrate at a high temperature above 30 degrees C is not discussed (Claims 78, 79, 82, 83).

Regarding claims 77, 81, Case et al. teach forming a semiconductor material on a substrate including providing a target made of semiconductor material in a sputter deposition chamber. Introducing a sputter gas into the chamber. Conducting a sputtering process on the target to produce a deposited semiconductor film on the substrate. Maintaining the semiconductor target at a temperature of less than about 350 degrees during the sputtering process. The semiconductor can be binary. (Column 7 lines 25-32; Column 7 lines 54-56; Column 8 lines 52-63) Case et al. teach that the target is temperature is maintained at less than 250 degrees C during the sputtering process. (Column 7 lines 54-56) Case et al. teach the power density can be "less than about" 1 W/cm^2. (Column 7 lines 56-58; i.e. 1.1 W/cm^2 is interpreted to read on " less than about" 1 W/cm^2.) Case et al. teach the target can be kept at a temperature less

than 350 degrees C and less than 40 mTorr. (Column 7 lines 44-51; Column 7 lines 54-56)

Regarding claims, 78, 79, 82, 83, Case et al. teach maintaining the substrate at a high temperature above 30 degrees C. (Column 7 lines 52-54)

The motivation for utilizing the features of Case et al. is that it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation. (Column 9 lines 38-41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Ovshinsky et al. by utilizing the features of Case et al. because it allows for reducing the losses of lighter nonmetallic atoms through sublimation or evaporation.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-84 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-56 of U.S. Patent No. 7,364,644 in view of Case et al. (U.S. Pat. 4,818,357) and Ovshinsky et al. (U.S. Pat. 5,534,711).

Claims 1-56 of U.S. Pat. 7,364,644 suggest the limitations of the present application except for the control of the temperature of the target.

Case et al. teach controlling the temperature of the target for depositing binary semiconductor material. (See Case et al. discussed above)

The motivation for utilizing the features of Case et al. is that it allows for preventing the material from evaporating.

Ovshinsky et al. teach typical conditions for depositing memory material including a substrate temperature during sputtering ranging from ambient temperature to 300 degrees C. (See Table 2; Column 20 lines 56-67) Since the range of temperatures taught by Ovshinsky et al. cover the range of temperatures required for depositing alpha silver selenide and beta silver selenide Ovshinsky et al. suggest depositing alpha and beta silver selenide.

The motivation for utilizing the features of Ovshinsky et al. is that it allows for making a semiconductor memory element. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the claims of U.S. Pat. 7,364,644 by providing cooling as taught by Case et al. and Ovshinsky et al. because it prevents evaporation of the target material during sputtering.

Response to Arguments

Applicant's arguments filed March 2, 2009 have been fully considered but they are not persuasive.

In response to the argument that Ovshinsky does not teach utilizing the claimed target temperature, it is argued that Case teaches utilizing the claimed target temperature for prohibiting the sublimation or evaporation of the target materials in the target. (See Case discussed above)

In response to the argument that Ovshinsky et al. does not teach silver selenide including alpha and beta phases of silver selenide being useable as a suitable memory material, it is argued that Ovshinsky teach the memory material of the device being formed from a plurality of atomic constituent elements including at least one chalcogen element (i.e. Se) and may include at least one transition metal element (i.e. Ag). (See Ovshinsky et al. Column 14 lines 64-68; Column 15 lines 1-12)

In response to the argument that Case is not concerned with forming memory devices, it is argued that the primary reference to Ovshinsky was relied on to suggest forming memory devices. (See Ovshinsky discussed above)

In response to the argument that Case taken as a whole teaches away from the method claimed, it is argued that Case does not teach away because Case teach that a

target must be cooled to prevent evaporation or sublimation from the target. (See Case discussed above)

In response to the argument that there is no motivation to utilize the features of Case in Ovshinsky, it is argued that the motivation for utilizing the features of Case in Ovshinsky is that it allows for preventing the evaporation or sublimation of the target. (See Case discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to the argument that the inherency doctrine has been misapplied, it is argued that since Ovshinsky et al. teach coating from ambient temperature to 300 degrees C the coating would produce alpha and beta phase silver selenide. (See Ovshinsky et al. discussed above)

The obviousness type double patenting rejection has been maintained since Applicant’s have not pointed out an error in the rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
June 1, 2009